SPECIFICATION

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN THAT I, Hisashi Nakagomi, a citizen of Japan residing at Yokohama-shi, Kanagawa Japan have invented certain new and useful improvements in

COMMUNICATION TERMINAL CAPABLE OF UTILIZING MULTIPLE RADIO COMMUNICATION SYSTEMS, AND SOFTWARE TRANSMITTING SERVER AND IC CARD WRITER FOR COMMUNICATION SOFTWARE

Of which the following is a specification:-

TITLE OF THE INVENTION

COMMUNICATION TERMINAL CAPABLE OF UTILIZING MULTIPLE RADIO COMMUNICATION SYSTEMS, AND SOFTWARE TRANSMITTING SERVER AND IC CARD WRITER FOR COMMUNICATION SOFTWARE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention generally relates to a shared radio communication system established by a plurality of radio communication systems, communication terminals capable of utilizing each of radio communication services provided by such a plurality of radio communication systems, and IC card writers for writing radio communication software into IC cards to be attached to communication terminals.

20

25

30

15

A variety of radio communication systems have been developed recently. These radio communication systems provide different services and have different service areas. Accordingly users have to use different communication terminals in order to utilize different radio communication systems. It is, however, inconvenient to carry a plurality of communication terminals, and therefore one communication terminal (referred to as "shared communication terminal" hereinafter) that can be shared or can be commonly used for a plurality of radio communication systems has been developed recently.

35

Such conventional shared communication terminals, however, have one hardware set that can

be commonly used for a plurality of predetermined radio communication systems. The conventional shared communication terminals cannot be utilized for other radio communication systems for which the built-in hardware is not compatible.

Radio communication software packages necessary for utilizing each communication service are pre-installed in the conventional communication terminals and cannot be rewritten. Therefore, users have to purchase a new communication terminal in order to utilize a new communication service provided by a new radio communication system.

One another approach is shown in Japanese Patent Laid-open Publication No. 11-73095, in which a converter provided between a base station and communication terminals is used for a plurality of radio communication services. In this technology, a special converter is provided separately from communication terminals, introducing complexity and inconvenience.

25 SUMMARY OF THE INVENTION

5

10

30

Accordingly, it is one object of the present invention to provide a communication terminal that is capable of easily utilizing a plurality of radio communication services respectively provided by a plurality of radio communication systems establishing a shared radio communication system.

Another and more specific object of the present invention is to provide a communication terminal capable of utilizing a plurality of radio

communication services respectively provided by a plurality of radio communication systems establishing a shared radio communication system, comprising: a hardware processing unit for performing common hardware processing necessary for utilizing the radio communication services; an IC card that stores a plurality of communication software packages necessary for the respective radio communication services; a software selection unit that selects one communication software package out 10 of the communication software packages stored in the IC card, which corresponds to a communication service to be utilized; and a software executing unit that executes the selected communication 15 software package.

The communication software package stored in the IC card can comprise a software program relating to signal transmission/reception, a software program relating to signal modulation/demodulation and a software program relating to application.

The communication terminal can further

25 comprise a software acquisition unit that acquires a communication software package stored in a server provided in the shared communication system.

The software selection unit can comprise a software reading unit that reads a communication software package out of the communication software packages stored in the IC card, which corresponds to a communication service to be utilized.

Another object of the invention is to provide a software transmitting server, comprising: a software storing unit that stores a plurality of

software packages respectively necessary for utilizing a plurality of communication services respectively provided by a plurality of radio communication systems; and a software transmitting unit that transmits the stored communication software packages to a communication terminal.

5

10

15

20

25

A further object of the invention is to provide an IC card writing apparatus, comprising: a software storing unit that stores the software packages respectively necessary for utilizing the communication services respectively provided by a plurality of radio communication systems; and a software transmitting unit that transmits the stored communication software packages to an IC card to be attached to a communication terminal.

According to one feature of the present invention, the general purpose hardware performs common hardware processing only, and other processing unique to each communication service is performed by the software processing part using the respective communication software package stored in the IC card. Therefore, the shared communication terminal depends as little as possible on the hardware, and can easily utilize many communication services provided by many radio communication systems.

Since a plurality of communication software packages necessary for utilizing communication services provided by a plurality of communication system are stored in an IC card, when a user wants to change his/her communication terminal, he/she only has to insert the original IC card into a new communication terminal to reduce or avoid inconvenience of the terminal changing process.

```
Features and advantages of the present
Features and advantages of the present that the description from the annarent from are set forth in herome annarent sinvention and in nart will herome annarent forth the description are set forth in herome annarent from the set forth in herome annarent from the set forth will herome annarent from the set forth in herome from the set
              invention are set forth in the description that the description are set forth in become drawings. Or may invention and in part will become drawings. Or may drawing and the accompanying drawing drawi
                            follows, and in part will become apparent from may be are are accompanying drawings, or may to according to and the accompanying description practice of the invention according to description practice
                                           description and the accompanying drawings or may to description and the accompanying drawings or on oniect the the description and the accompanying drawings or oniect the description and the accompanying drawings or oniect the description according to the description and the accompanying drawings.
                                                            learned by practice of the invention according to objects the invention according to the invention according to objects the invention according to objects according to object according to object according to object according to objects according to objects acco
                                                                             the teachings provided in the description of the teachings provided in the realized and and attained the teachings provided in the realized and and attained as well as well as went invention will be realized as well as went invention
                                                                                           as well as other particularly pointed out in the present invention particularly pointed out in the an apparatus particularly pointed out in the present apparatus particularly pointed out in the present invention particularly pointed out in the present invention particularly pointed out in the particularly pointed out in the present invention particularly par
                                                                                                          present invention will be realized and attains

present invention will be realized out in the pointed out in the same apparatus particularly pointed out of the same apparatus particularly pointed out in the same apparatus particularly particul
                                                                                                                        an apparatus particularly pointed out in the and concise, having ordinal apparatus particularly pointed out in the and concise, having ordinal person having ordinal apparatus particularly pointed out in the and concise, and concise, having ordinal apparatus particularly pointed out in the and concise, having ordinal apparatus particularly pointed out in the and concise, having ordinal apparatus particularly pointed out in the and concise, having ordinal apparatus particularly pointed out in the and concise, having ordinal apparatus particularly pointed out in the and concise, having ordinal apparatus particularly pointed out in the and concise, having ordinal apparatus particularly pointed out in the and concise, having ordinal apparatus particularly pointed out in the and concise, having ordinal apparatus particularly pointed out in the and concise, having ordinal apparatus particularly pointed out in the and concise, having ordinal apparatus particularly pointed out in the and concise, having ordinal apparatus particularly pointed out in the and concise, having ordinal apparatus particularly pointed out in the and concise, having out in the and concise, havi
                                                                                                                                         specification in such to practice the invention.

specification as to practice the exact the exact in the art skill in the art.
                                                                                                                                                        exact terms as to enable a person having ord invention.

exact terms art to practice the invention.
                                                                                                                                                                                                                                                                                                                                                                            EIG. 1 shows a basic concept of a software
                                                                                                                                                                                     BRIEF DESCRIPTION OF THE DRAWINGS
                                                                                                                                                                                                                                     to the present distributing system according to the present distribution.
                                                                                                                                                                                                                                                                                                                                                                                                                             FIG. 2 is a schematic View of a shared of 
                                                                                                                                                                                                                                                                                   communication terminal according to an embodiment of the present invention:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      nt invention; block diagram of the inside
                                                                                                                                                                                                                                                                                                                                 FIG. 3 is a block diagram of the inside terminal shown terminal sh
                                                                                                                                                                                                                                                             invention;
                                                                                                                                                                                                                                                                                                         the present invention;
                                                                                                                                                                                                                                                                                                                                                                               inside structure of the 2.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  shown in FIG. 2; diagram of the inside
                                                                                                                                                                                                                                                                                                                                                                                                                             FIG. 5 is a block diagram of the inside to present software server according to present structure of a software server according to present according to present to present according to present to pr
                                                                                                                                                                                                                    20
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                and 6 is a block diagram of an IC card invention
                                                                                                                                                                                                                                                                                                                                                                                                     terminal shown in FIG. 2:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                        FIG. 6 is a block diagram of an IC card invention.

FIG. 6 is a block the present invention.
                                                                                                                                                                                                                                                                                                                                                    in FIG. 2:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                DESCRIPTION OF THE PREFERRED EMEODIMENTS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  In the following, embodiments of the
                                                                                                                                                                                                                                                                                                                                                                                                                                                     invention; and
```

```
Present invention drawings.
                                                                                                                                                                                                                                                    FIG. 1 schematically shows a concept of a
                                                                            FIG. 1 schematically snows a concept the shows a c
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            on system according distribution the communication
                                                                                                             present invention. in FIG. communication system

system 100 shown radio communication system
                          the accompanying drawings.
                                                                                                                                                      102 for a shared by a switching system 104. a switching system 104. a switching system 104. a system 104. a switching system 1
                                                                                                                                    system 100 shown in FIG. 1 includes a system communication communication
                                                                                                                                                                        established by a plurality of radio communication 106, communication 106, system storing communication communication system storing communication systems, systems, server 108 for storing communication communication communication approximate systems, server 108 for storing communication communication approximate systems, a software server 108 for storing communication 106, communication 106,
                                                                                                                                                                                            systems, a switching system 104, a pase station of the storing communication to the storing communication of the storing communication of the systems, a switching system as of twarp narkages a softwarp narkages
                                                                                                                                                                                                                 a software packages after referred to as merely (hereinafter and 110-2)
                                                                                                    present invention.
                                                                                                                                                                                                                                   software Packages | Ic card maintenance merely | Ic card maintenance | Ic card maintenanc
                                                                                                                                                                                                                                                    and 110-2 (hereinafter 110" for terminal end card maintenance tool communication terminal end card maintenance tool communication
                                                                                                                                                                                                                                                                         card maintenance tool 110" for indicating both as terminal such as tools! communication terminal 120 tools! communication terminal 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        The software server 108 and the IC card
                                                                                                                                                                                                                                                                                              a mobile communication terminal 120.
                                                                                                                                                                                                                                                                                                                                                The software server luw and the ic card

The software server hand. the IC card

The tool 110-1 are hand. the IC card

maintenance on the other hand.
                                                                                                                                                                                                                                                                                                                                                                                      network 102. tool 110-2 is not connected to the maintenance and stands alone.
                                                                                                                                                                                                                                                                                                                                                                    maintenance tool 110-2 is not connected to the connected to the other nand connected to the other nat connected to the other national nati
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   In this communication software server necession the software packages necession softwa
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     distribution system 100, software packages necessary the softw
                                                                                                                                                                                                           15
                                                                                                                                                                                                                                                                                                                                                                                                              mathicenance and stands alone.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         transmits communication software packages necessary software packages necessary the shared
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        for utilizing communication systems to the shared to the network to the core network to plural radio terminal 120 via the core network to plural radio terminal 120 via the core network to the core network to the core network th
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             plural radio communication systems to the shared 102, the shared 102, and the hase station 106.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 communication terminal 104 and the base station 106.

communication system 104 and 110 writes the the switching system aintenance the switching aintenance the switching system and the switching sy
                                                                                                                                                                                                                                                                                                       20
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                the switching system 104 and the base station to tool 110 writes the tool 110 more early for the IC card maintenance nackage nackage to the tool 120 more early for the IC card maintenance nackage to the tool 120 more early for the IC communication
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     The IC card maintenance packages necessary no communication software packages necessary necessary no communication software packages necessary necessary no communication software packages necessary necessar
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      communication software packages necessary for the rc calculation software packages provided by rc calculation services provided the rc calculation systems into the rc calculation systems in rc calcu
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           utilizing communication services provided by the IC card the IC 120.

utilizing communication systems into terminal 120.

plural radio the shared communication the shared to the shared communication the shared communication the shared to the shared communication the shared to the shared communication the shared to the shared communication the shared communication the shared to the shared communication the shared commu
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Plural radio the shared communication terminal 120 acquires the attached to attached to the shared communication terminal termina
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              attached to the shared communication terminal 120 or the shared communication terminal 120 acquires server 10% or attached to the software server 10% or the software packages
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   The shared communication the software server 108 or the software packages
```

the IC card maintenance tool 110, selects one communication software package corresponding to a communication service to be utilized, and executes the selected communication software package, to utilize the communication service selected out of the multiple communication services.

FIG. 2 shows a schematic view of a shared communication terminal according to the present invention. The shared communication terminal 120 may be, for example, a communication terminal employed in a third generation mobile communication system. The main body 122 of the shared communication terminal 120 has a display 125 such as a liquid crystal display, an operation part 126 such as a key pad, and an IC card slot 127 for inserting an IC card 124.

FIG. 3 shows the block diagram of an example of the inside structure of the shared communication terminal 120. The shared communication terminal 120 shown in FIG. 3 comprises a main body 122 and an IC card 124. The main body 122 includes general purpose hardware 130, a software processing part 132, and a memory part 134.

The memory part 134 stores basic software 140. This basic software 140 is common software necessary for utilizing each of the radio communication services provided by the plural radio communication systems.

30

The IC card 124 stores a customer information administration software program 142, RF software programs 144-1, 144-2 (hereinafter referred to merely as "radio frequency (RF) software 144" for indicating both RF software programs), baseband

software programs 146-1, 146-s (hereinafter referred to merely as "baseband software 146" for indicating both baseband software programs), and application software programs 148-1, 148-2 (hereinafter referred to merely as "application software 148" for indicating both application software programs).

Out of these software programs stored in the IC card 124, the RF software 144-1, the baseband software 146-1 and the application software 148-1 compose a communication software package necessary for utilizing a first radio communication service provided by a first radio communication system. And the RF software 144-2, the baseband software 146-2 and the application software 148-2 compose another communication software package necessary for utilizing a second radio communication service provided by a second radio communication system.

10

15

20 The customer information administration software 142 is for administering customer information (such as a telephone number assigned to the shared communication terminal 120, information relating to communication services available to the shared communication terminal 120, etc.) existing in 25 the core network 102. The RF software 144 is for processing signal transmission and reception (such as signal detection) between the shared communication terminal 120 and the bases station 106. The baseband software 146 is related to signal 30 modulation and demodulation such as digital conversion of received signals. The application software 148 is for processing user applications such as JAVA (a registered trademark) or other 35 applications for outputting sound or displaying characters and images and so on.

The general purpose hardware 130 performs common hardware processing necessary for utilizing each of the communication services provided by the multiple communication systems.

5

10

The software processing part 132, cooperating with the general purpose hardware 130, selects one communication software package out of the communication software packages stored in the IC card 124, corresponding to a communication system to be utilized, and executes the selected communication software package and the basic software in the memory part 140.

In more detail, the software processing part 132 identifies a radio signal having the maximum reception strength out of a plurality of radio signals transmitted from the base station 106, and specifies the communication service provided by the communication system corresponding to the maximum reception radio signal. Alternatively, the software processing part 132 specifies a communication service in response to user's instruction.

25

30

35

Next, the software processing part 132 selects a communication software package necessary for utilizing the specified communication service, composed of the RF software 144, the baseband software 146 and the application software 148. For example, each radio communication service provided by each communication system is previously assigned identification information (communication service identification information), that uniquely identifies one communication service. Each communication software package necessary for utilizing the respective communication service is

```
stored together the Tr. card 174
stored together the Tr. card 174
                   stored together the IC card 132 can search for and information processing part 132 can software processing the software proces
                                           intormation in the IC card 132 can search for and intormation in the part anfrware processing part anfrware narvage software the communication to select
                                                                                      select the communication to communication service to the communication to communication service corresponding to assigned communication service
                                                               sortware processing part like communication software processing part ion software package software the communication software the communication software processing part like software pro
                                                                                                          corresponding to the specified communication service using such assigned communication service
                                                                                                                                 using such assigned communication as a search key.
identification information as a
                                                                                                                                                                                                                                                                                                                                                                                           When the software processing part 134

When the software part 134

When th
                                                                                                                                                                                          when the software processing part 134

when the software processing part 134

processes signal the remarkable processing part 134

processes signal the software processing part 134

processes signal the software processing part 134

processes signal the software processes with the software part 134

processes signal the software processes with the software part 134

processes signal the software processes with the software pro
                                                                                                                                                                                                                    processes with hasic software 140 and the selected processes the hasic software 140 and the selected processes with his selected processes w
                                                                                                                                                                                                                                        cooperates the basic software the software the when the software and the software and the software the when the software processing nart 13.
                                                                                                                                                                                                                                                               executes the basic software the software and demodulation and demodulation
                                                                                                                                                                                                                                                                                software 144. When the software processing part 1 when the software process and demodulation 130 modulation purpose hardware 130 modulation purpose hardware 144.
                                                                                                                                                                                                                                                                                                       processes with the general purpose the selected and the selected the basic software law are the basic software law are the executes
                                    5
                                                                                                                                                                                                                                                                                                                                  cooperates the basic 146.

cooperates the basic 146.

coeperates the basic 146.

coeperates the basic 146.
                                                                                                                                                                                                                                                                                                                                            executes the basic 146.

executes the basic 146.

baseband software annication processing annication processing annication processing.
                                                                                                                                                                                                                                                                                                                                                                                              part 134 processes the general purpose the selected and the selected the part to software 140 and the selected executes
                                                                                                                                                                                                                                                                                                                                                                       baseband software lab. When the software processing, when the processing, when processing, and processes application processes application of the hardware h
                                                                                                                                                                                                                                                                                                                                                                                                                  cooperates the basic software 148 executes annication software annication software the selected software executes annication software the software t
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      The shared communication terminal 120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            shown in FIG. software stored in terminal 120 ca communication the shared communication the shar
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             communication software stored in the IC card 120 can the shared communication software into the shared communication software into the communication software stored in the IC card 120 can main the IC card 120 can
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        shown in FIG. a feturary of a formal in the shown in the communication termining the shown in th
                                                                                                                                                                                                                                                                                                                                                                                                                                                J. J. Software 148.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       However, the shared communication terminal the main the shared communication software into carion the shared communication the read communication the shared communication the shared communication the shared communication terminal the main the shared communication terminal the shared communication terminal the shared communication terminal the shared communication terminal the shared communication the
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     also read the communication the read communication the read the communication the read comm
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 and then execute as shown in the late of t
                                                                                                                                                                                                                                                                                                                                            20
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       software processing part to be utilized of a RF communication software nackage composed of a communication software nackage
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       software processing part in he intilized software communication
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              communication software package composed of nrong communication software package composed communication software nagenand anfrware communication program 144
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      communication software package composed of a RF program 148 software program 144, software program 146 and an application software program 146 and an application software program 146 and an application software program software program software program application software program a software program application software program appli
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              146 and an application the specified communication the specified the stores the solutilizing 124. and stores the solutilizing necessary the IC card 124.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      software program 144, a paseband program 148 software program 144, a software program 200 committee and committee and application the energial application and an application the energial application and an application the energial application are a software program 146 and an application are a software program 144, a passeband program 148 and a software program 144, a passeband program 148 and a software program 144, a passeband program 148 and a software program 144, a passeband program 148 and a software program 144, a passeband program 148 and a software program 144, a passeband program 148 and a software program 144, a passeband program 148 and a software program 144, a passeband program 148 and a software program 144, a passeband program 148 and a software program 144, a passeband program 144, a passeband
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  necessary for the IC card 124, and schade in the service service communication action software nackade
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             software.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         service trom the ic card 124, and stores in the so.

Service trom the ic card 124, and stores in the composed communication software package in the composed composed
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           35
```

rewritable memory part 134. Then the software processing part 132, the same as shown in FIG. 3, cooperates with the general purpose hardware 130 and executes the basic software 140, the stored RF software 144, the stored baseband software 146 and the stored application software 148.

The software processing part 132 can cooperate with the general purpose hardware 130 and receive communication software transmitted from the software server 108 connected to the core network 102, and store it in the IC card 124. In a case where the IC card maintenance tool 110 has written communication software into the IC card 124, the software processing part 132 identifies the written communication software when the IC card 124 is inserted into the IC card slot 127.

10

15

FIG. 5 shows the block diagram of an 20 example structure inside the software server 108. The software server 108 shown in FIG. 5 includes a software storage 202 and a software transmitter 204.

The software storage 202 stores

25 communication software packages (RF software 144,
baseband software 146 and application software 148)
to be transmitted to the shared communication
terminal 120.

30 The software transmitter 204 identifies a communication service available to the shared communication terminal 120, based on the customer information existing in the core network 102. The software transmitter 202 further reads out a communication software package necessary for utilizing the identified communication service from the software storage 202, and transmits it to the

shared communication terminal 120 via the core network 102, the switching system 104 and the base station 106.

FIG. 6 shows the block diagram of an example structure inside the IC maintenance tool 110. The IC maintenance tool 110 shown in FIG. 6 includes a software storage 212 and a software writer 214.

The software storage 212 stores communication software packages (RF software 144, baseband software 146 and application software 148) to be written into the IC card 124 of the shared communication terminal 120.

15

20

The software writer 214 can perform two kinds of processing. In a case where the IC card maintenance tool 110 is not connected to the core network 102 but stands alone, the software writer 214 selects a communication software package in the software storage 212 and writes it into the IC card 124 in response to an operator's selection of communication software.

25 On the other hand, in a case where the IC card maintenance tool 110 is connected to the core network 102, the software writer 214 identifies a communication service available to the shared communication terminal 120, based on the customer 30 information existing in the core network 102. software transmitter 202 further reads out the communication software package necessary for utilizing the identified communication service from the software storage 212, and writes it into the IC 35 card 124. This case can reduce the operator's workload, and avoid the operational mistake of writing a communication software package

corresponding to an unavailable communication service to the IC card 124.

As explained above, in the communication software distribution system 100 according to the embodiment of the present invention, the shared communication terminal 120 acquires communication software packages from the software server 108 or the IC card maintenance tool 110, selects a 10 communication software package corresponding to a communication service to be utilized, and executes the selected communication software package. general purpose hardware 130 performs common hardware processing only, and other processing 15 unique to each communication service is performed by the software processing part 132 using the appropriate communication software package stored in the IC card 124. Therefore, the shared communication terminal 120 depends as little as 20 possible on the hardware, and can easily utilize many communication services provided by many radio communication systems.

The communication software is stored in

the IC card 124, but not in the main body of the
shared communication terminal 120. Therefore, when
a user changes his/her communication terminal,
he/she only has to insert the original IC card into
a new communication terminal to reduce or avoid
inconvenience of the terminal changing process.

According to the embodiment of the present invention, the general purpose hardware performs common hardware processing only, and other processing unique to each communication service is performed by the software processing part using the appropriate communication software package stored in

35

the IC card. Therefore, the shared communication terminal depends as little as possible on the hardware, and can easily utilize many communication services provided by many radio communication systems.

Since a plurality of communication software packages necessary for utilizing communication services provided by a plurality of communication system are stored in an IC card, when a user wants to change his/her communication terminal, he/she only has to insert the original IC card into a new communication terminal to reduce or avoid inconvenience of the terminal changing process.

15

20

10

5

The present application is based on Japanese Priority Patent Application No. 2002-218174 filed on 7/26/2002 with the Japanese Patent Office, the entire contents of which are hereby incorporated by reference.